



# US Fuel Cell Council

## Fuel Cells: Transportation Applications

### The Race is On...

The world's leading automakers are in a race to bring fuel cell vehicles to the marketplace. The goal: to offer an alternative to the internal combustion engine that provides the performance



consumers now demand, is more efficient and cleaner, and may be less expensive to manufacture, maintain and operate.

Fuel cell vehicles (FCVs) will be 2 to 3 times more efficient than a gasoline internal combustion engine, and will be able to utilize hydrogen from a variety of fuels.

About 60 million new cars are sold worldwide each year. Automotive industry leaders have speculated that fuel cell vehicles could account for 20 to 25 percent of new car sales within the next 20 to 25 years, a potential market of 12 million to 15 million vehicles each year.

### The State of Development

While there are several different types of fuel cells, proton exchange membrane (PEM) fuel cells are now found under the hood of most prototype fuel cell cars and buses. Fuel cell stacks with electric capacities of 50 to 75 kilowatts and more are powering these prototype vehicles. Solid oxide fuel cells (SOFCs) are being tested on cars and trucks with traditional powertrains as "auxiliary power units," allowing long-haul trucks to stop idling large diesel engines, and providing an array of benefits for today's electricity-hungry automobiles.

Tremendous improvements in fuel cell efficiency, as well as weight and size reductions, have been achieved in recent years. But more remains to be done. As one automaker has stated, fuel cell technology is "fit for practical use," so the focus has shifted to finding ways to reduce fuel cell

costs and preparing for the economies of scale found in mass production.

Today, fuel cell technology is being demonstrated in a great variety of transportation applications: from scooters and passenger cars, to buses and bicycles, and even to locomotives and big rigs.



To date, more than 50 vehicles have been demonstrated using fuel cell technology. Every major automaker is looking at fuel cells either for powering vehicle propulsion, or for supplying electricity for non-propulsion power needs such as lights and air conditioning.

The first commercial fuel cell vehicle sales are expected as early as 2003–2007. Full commercialization will probably come by the end of the decade.

For more information and photos, visit our web site at [www.usfcc.com](http://www.usfcc.com).

### *Fuels for Fuel Cell Vehicles*

*Centrally located hydrogen production plants could produce the necessary hydrogen (extracted from hydrocarbon fuels or water) and distribute it in liquid form to local retail stations for dispensing into fuel cell cars capable of storing either gaseous or liquefied hydrogen. Another option would be to convert hydrocarbon fuels into hydrogen gas at the retail station for dispensing to the vehicle. Promising research is focusing on the use of metal and chemical hydrides for storing hydrogen.*

*The reforming of gasoline and alcohol fuels on-board an FCV is another option being actively pursued. Synthetic hydrocarbon fuels also may play a prominent role in fueling the fuel cell cars of the future.*